受験番号：22IPE002

問１

What is claimed is:

1. An optical sensor comprising:

a light-emitting section for emitting a pulsed light to the outside based on a pulse signal;

a light-receiving section for generating an optical current corresponding to the intensity of an incident light from the outside;

a current-voltage converter circuit for converting the optical current into a voltage signal;

a high-pass filter for extracting an alternating current component of a predetermined frequency or higher from the voltage signal, the alternating current component being outputted as a filter output having a signal waveform with a reference voltage at the center;

a polarity inversion amplifier that switches between a noninverting amplifier state and an inverting amplifier state based on the pulsed signal, the polarity inversion amplifier outputting the filter output without being inverted in the noninverting amplifier state and outputting the filter output being inverted around the reference voltage in the inverting amplifier state; and

an integrator for integrating the output of the polarity inversion amplifier based on the reference voltage.

2. An optical sensor according to claim 1, wherein the optical sensor further comprises a delay circuit for delaying the pulsed signal, the pulsed signal being outputted to the polarity inversion amplifier.

問２

There is known a game system that generates images seen from given viewpoints within an object space that is a virtual three-dimensional space. This type of game system is popular as they allow users to experience the so-called virtual reality. For example, in role-playing games, the player operates a character (object) to cause it to move on a map within the object space. The player enjoys the game by causing the character to fight with enemy characters, converse with other characters, or visit various towns.

In this type of game system, objects that represent characters and the like are

usually made up of a plurality of polygons. Objects made up of polygons are arranged within an object space. The so-called geometric processing is carried out to generate images seen from virtual cameras. In this way, game images can be generated that do not contradict one another even when objects are seen from various directions using virtual cameras.

While being mathematically correct images, however, game images generated in this way do not appeal to the sentiments of players. For example, when representing characters that appear in animations or cartoons by objects, shading objects by Gouraud shading or the like provides realistic images, but it generates images that look different from those that viewers have accustomed to through animations, cartoons, and the like.

問 3

As shown in Fig. 4, when a human presence sensor 25, installed on the outdoor side of an entrance door together with a luminaire 20, senses a human body 30, first an illumination lamp of the luminaire 20 switches on. When the illumination lamp of the luminaire 20 switches on, the current that passed through the luminaire 20 is detected by a current detector circuit 14 (Fig. 3).

With a current detection signal outputted from this current detector circuit 14 serving as trigger, a control unit 200 switches on an illumination lamp of a luminaire 10 after predetermined switch-on interval time has elapsed since the illumination lamp of the luminaire 20 switched on based on previously-set setting condition information. In this way, this illumination system 100 can be used to help in the prevention of crimes and the like because it can make believe that there are residents indoors in the cases the human body 30 is a suspicious character or the like.

In response to the current detection signal from the current detector circuit 14, a controller 15 for example controls an LED circuit 17 to switch on an LED to inform the switch-on status of the illumination lamp of the luminaire 20, and turns a switch 19 into an ON state after previously-set switch-on interval time t1 has elapsed since the illumination lamp of the luminaire 20 switched on. When the switch 19 is in the ON state, current passes in the electric lamp line on the side of the luminaire 10, and the illumination lamp of a luminaire 10 switches on to be in the switch-on state.